RADIOCHEMICAL DETERMINATIONS IN VEGETATIVE REFERENCE MATERIALS II (NUTP)

DSS File 36SR.23241-4-1704

Contract Serial: OSR84-00217

by

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JUL 03 1985

MICROMEDIA

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April 17, 1985

Dr. Lloyd Dalton
CANMET
Department of Energy, Mines
& Resources Canada
560 Rochester Street
Carling Square One (Lower Level)
Ottawa, Ontario

Dear Dr. Dalton:

Re: DSS File 36SR.23241-4-1704
Contract Serial: OSR 84-00217

Our report concerning the determination of radionuclides in vegetative reference materials II is attached. If you have any questions not addressed in this report don't hesitate to contact either myself or Dr. Chiu.

Thank you very much for the opportunity to be of service.

Yours truly,

J.R. Dean, Ph.D.
General Manager

JRD:be
Encl.

METHODOLOGY

(1) Decomposition

Five gram samples of both CLV-1 and CLV-2 were decomposed by perchloric acid digestion as detailed in section 2.5.6. of the NUTP Radiochemical Methods Manual. Five gram subsamples were used. Four digestions were done for each of the following determinations: Ra-226, Th-230, Pb-210 and Po-210.

(2) Tracers

Ba-133, Th-234 and Po-208 were used as tracers for the determinations of Ra-226, Th-230, and Po-210 respectively. For the Pb-210 determinations, five standard solutions were run simultaneously to check recovery.

(3) Acid Blanks

Acid blanks were determined for Ra-226, Th-230, Pb-210 and Po-210.

(4) Ra-226

Ra-226 was coprecipitated from the digestate with lead sulfate, dissolved in alkaline DTPA and reprecipitated with $BaSO_4$ at pH-5. The $Ba(Ra)SO_4$ was filtered onto a 0.45 µm filter.

Ra-226 was determined by alpha spectrometry and Ba-133 was counted on a gamma counter. (See section 5.1 of NUTP Radioanalytical Methods Manual for details.)

(5) Th-230

Th-230 and Th-234 tracers were coprecipated from the digestate with lead sulfate, dissolved in alkaline DTPA, extracted into 5% HDEHP in hexane, back extracted into oxalic acid and coprecipitated with cerous hydroxide. The hydroxides precipitate was filtered onto a 0.2 µm filter. Th-230 and Th-234 were determined by alpha spectrometry and beta counting respectively (see section 9 of NUTP Radioanalytical Methods Manual for detail.)

(6) Pb-210

Bio-210, a daughter of Pb-210, was extracted from the digestate with 0.1% DDTC in Chloroform, coprecipitated with bismuth oxychloride. The precipitate was filtered onto a 0.45 cm filter and Bi-210 was determined by beta counting (see section 7. of NUTP Radioanalytical Methods Manual for detail.)

(7) Po-210

The digestate was made up to 5% HCl, Po-210 and Po-208 tracer were plated onto a nickel disc at 60°C for two hours. Both Po-210 and Po-208 were determined by alpha spectrometry.

CALIBRATION STANDARDS

All standards for this study were supplied by the Amersham Radiochemical Centre, England. The Amersham codes for Ra-226, Th-228 and Pb-210 are RAY.44, RLZ.44 and RBZ.44 respectively. Then uncertain ties are 4%. The Pb-210 Standard is also used as a standard for Po-210 since they are in secular equilibrium.

ANALYTICAL RESULTS

Sample Description	Ra-226 (BQ/kg)	Th-230 (BQ/kg)	Pb-210 (BQ/kg)	Po-210* (BQ/kg)
CLV-1-1	774 ± 3	309 ± 3	662 ±23	664 ±11
CLV-1-2	774 ± 3	349 ± 2	729 ±30	515 ±10
CLV-1-3	673 ± 5	264 ± 5	684 ±25	638 ±11
CLV-1-4	829 ± 5	282 ± 2	634 ±25	582 ±10
Average ± 1σ	762 ±65	301 ±37	677 ±40	600 ±66
CLV-2-1	43.0± 1.3	30 ± 2	92 ± 4	92 ± 3
CLV-2-2	39.6± 1.2	22.3± 1.5	79 ± 3	87 ± 3
CLV-2-3	44.0± 1.0	26.4± 0.8	93 ± 4	99 ± 3
CLV-2-4	43.6± 0.9	24.2± 1.3	62 ± 3	87 ± 3
Average ± 1σ	43 ± 2	26 ± 3	82 ±14	91 ± 6

*As of April 4, 1985.